

1        CLAIMS:

2            1.     A semiconductor processing method of electrochemical-  
3        mechanical removing at least some of a conductive material from over  
4        an upper surface of a semiconductor substrate comprising displacing a  
5        polishing operation location across the upper surface of the substrate  
6        from a central region of the substrate toward a periphery of the  
7        substrate and not displacing the polishing operation location from the  
8        periphery to the central region.

9  
10           2.     The method of claim 1 wherein the polishing operation  
11        location is defined by a location of a polishing pad relative to a surface  
12        of the substrate, and further comprising rotating the polishing pad  
13        separately from the displacement.

14  
15           3.     The method of claim 2 wherein an electrical circuit is  
16        provided through at least a portion of the conductive material during the  
17        removing, the circuit extending between the polishing pad and the  
18        periphery.

19  
20           4.     The method of claim 2 wherein the displacing comprises  
21        moving the substrate relative to the polishing pad.  
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1           5.     The method of claim 2 wherein the displacing comprises  
2 moving the polishing pad relative to the substrate.

3  
4           6.     The method of claim 2 wherein the displacing comprises  
5 moving both the polishing pad and the substrate.

6  
7           7.     The method of claim 1 further comprising, after the  
8 electrochemical-mechanical removing, chemical-mechanical polishing of the  
9 substrate utilizing a process that is not electrochemical-mechanical  
10 polishing.

11  
12           8.     A semiconductor processing method of electrochemical-  
13 mechanical removing at least some of a conductive material from over  
14 a surface of a circular semiconductive material wafer comprising radially  
15 displacing a polishing pad across the surface of the wafer, the radial  
16 displacing being only outwardly from a central region of the wafer and  
17 not inwardly toward the central region.

18  
19           9.     The method of claim 8 wherein the polishing pad is  
20 displaced circularly around the central region to define rings which  
21 progress increasingly outward toward a periphery of the wafer.

1           10. The method of claim 9 further comprising rotating the  
2 polishing pad separately from the displacement.

3  
4           11. A semiconductor processing method of electrochemical-  
5 mechanical removing of at least some of a conductive material from over  
6 a surface of a semiconductor substrate comprising:

7           providing a substrate having a conductive material thereover;

8           providing a cathode at a first location of the substrate;

9           providing an anode at a second location of the substrate, the  
10 anode being associated with a polishing pad polishing surface;

11           polishing the conductive material with the polishing pad polishing  
12 surface, the polishing occurring at a region of the conductive material  
13 and not at another region, the region where the polishing occurs being  
14 defined as a polishing operation location; and

15           displacing the polishing operation location across the surface of the  
16 substrate from said second location of the substrate toward said first  
17 location of the substrate, and not displacing the polishing operation  
18 location from said first location toward said second location when the  
19 polishing operation location is between the first and second locations.

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21           12. The method of claim 11 wherein the second location is more  
22 centrally located on the substrate than the first location.

1           13. The method of claim 11 further comprising rotating at least  
2 one of the polishing pad and the substrate separately from the  
3 displacement.

4  
5           14. The method of claim 11 wherein the polishing pad is pressed  
6 between a structure and the substrate, and wherein the displacing the  
7 polishing operation location comprises displacing the structure relative to  
8 the polishing pad.

9  
10          15. The method of claim 11 wherein the polishing pad only  
11 covers a portion of the conductive material, and wherein the displacing  
12 the polishing operation location comprises displacing the polishing pad  
13 relative to the substrate.

14  
15          16. The method of claim 15 wherein the displacing comprises  
16 moving the substrate relative to the polishing pad.

17  
18          17. The method of claim 15 wherein the displacing comprises  
19 moving the polishing pad relative to the substrate.

20  
21          18. The method of claim 15 wherein the displacing comprises  
22 moving both the polishing pad and the substrate.  
23

1           19. A semiconductor processing method of removing conductive  
2 material, comprising:

3           providing a semiconductor wafer having a conductive material  
4 thereover, the wafer comprising an upper surface and an outer periphery  
5 around the upper surface, the conductive material extending across the  
6 upper surface of the wafer and to about the periphery;

7           electrochemically removing at least some of the conductive material  
8 with a polishing pad having a surface in abrasive contact with only a  
9 portion of the conductive material; and

10          displacing the polishing pad across the upper surface of the wafer  
11 during the removing, the displacing being only from a central region of  
12 the wafer surface toward the periphery of the wafer.

13  
14          20. The method of claim 19 wherein the polishing pad is  
15 displaced circularly around the central region to define rings which  
16 progress increasingly outward toward the periphery of the wafer.

17  
18          21. The method of claim 19 further comprising rotating the  
19 polishing pad separately from the displacement.

1           22. The method of claim 19 wherein an electrical circuit is  
2 provided through at least a portion of the conductive material during the  
3 removing, the circuit extending between the polishing pad and the  
4 periphery.

5  
6           23. A semiconductor processing method of removing conductive  
7 material, comprising:

8           providing a semiconductor wafer having a conductive material  
9 thereover, the wafer comprising an upper surface and an outer periphery  
10 around the upper surface, the conductive material extending across the  
11 upper surface of the wafer and to about the periphery;

12           electrochemically removing at least some of the conductive material  
13 with a polishing pad having a surface in abrasive contact with only a  
14 portion of the conductive material, the portion of the conductive material  
15 in abrasive contact with the surface being defined as polishing operation  
16 location, the polishing pad extending over the conductive material to  
17 cover more of the conductive material than the polishing operation  
18 location; and

19           displacing the polishing operation location across the upper surface  
20 of the wafer during the removing, the displacing being only from a  
21 central region of the wafer surface toward the periphery of the wafer.  
22  
23

1           24. The method of claim 23 wherein the polishing operation  
2 location is displaced across the upper surface of the wafer without  
3 displacing the polishing pad.

4  
5           25. The method of claim 23 wherein the polishing operation  
6 location is displaced circularly around the central region to define rings  
7 which progress increasingly outward toward the periphery of the wafer.

8  
9           26. The method of claim 23 further comprising rotating the wafer  
10 separately from the displacement.

11  
12           27. The method of claim 23 wherein an electrical circuit is  
13 provided through at least a portion of the conductive material during the  
14 removing, the circuit extending between the polishing pad and the  
15 periphery.

1           28. A semiconductor processing method of removing conductive  
2 material, comprising:

3           providing a semiconductor wafer having a conductive material  
4 thereover, the conductive material defining a surface area, the surface  
5 area having a first portion surrounded by a second portion;

6           providing a polishing pad surface in abrasive contact with the first  
7 portion of the conductive material surface area and not in abrasive  
8 contact with the second portion of the conductive material surface area;

9           providing a circuit that extends across at least some of the first  
10 portion of the conductive material surface area;

11           electrochemically removing at least some of the conductive material  
12 from the first portion of the surface area by polishing the first portion  
13 with the polishing pad while flowing current through the circuit;

14           after electrochemically removing the at least some of the  
15 conductive material from the first portion, displacing the polishing pad  
16 relative to the wafer and electrochemically removing at least some of the  
17 conductive material from the second portion; and

18           not electrochemically removing conductive material from the first  
19 portion after electrochemically removing conductive material from the  
20 second portion.  
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1           29. The method of claim 28 wherein the first portion of the  
2       conductive material surface area is more centrally located on the wafer  
3       surface than the second portion of the conductive material surface area.

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5           30. The method of claim 28 further comprising rotating at least  
6       one of the polishing pad and the wafer separately from the displacement.

7  
8           31. The method of claim 28 wherein the displacing comprises  
9       moving the wafer relative to the polishing pad.

10  
11          32. The method of claim 28 wherein the displacing comprises  
12       moving the polishing pad relative to the wafer.

13  
14          33. The method of claim 28 wherein the displacing comprises  
15       moving both the polishing pad and the wafer.

1           34. A semiconductor processing method of electrochemically  
2 removing conductive material, comprising:

3           providing a semiconductor wafer having a conductive material  
4 thereover, the conductive material defining a first surface area, the first  
5 surface area having a central portion and an outer peripheral portion  
6 surrounding the central portion, the outer peripheral portion having an  
7 outermost edge;

8           providing at least one first electrical contact in electrical connection  
9 with the outermost edge of the outer peripheral portion of the  
10 conductive material;

11          providing a polishing pad proximate the central portion of the  
12 conductive material, the polishing pad having a polishing surface, the  
13 polishing surface defining a second surface area, the second surface area  
14 being less than the first surface area;

15          providing at least one second electrical contact in electrical  
16 connection with the polishing surface of the polishing pad, the first and  
17 second electrical contacts being in electrical connection through a power  
18 source and defining a circuit that extends through the conductive  
19 material;

20          electrochemically removing at least some of the conductive material  
21 from the central portion by polishing the wafer with the polishing pad  
22 while flowing current through the circuit; and

23          only after electrochemically removing at least some of the

1     conductive material from the central portion, displacing the polishing pad  
2     relative to the wafer to provide the pad proximate the outer peripheral  
3     portion of the conductive material and utilizing the polishing pad to  
4     electrochemically remove at least some of the conductive material from  
5     the peripheral portion.  
6

7             35. The method of claim 34 wherein the displacing comprises  
8     moving the polishing pad circularly around the central region to define  
9     rings which progress increasingly outward toward the peripheral portion  
10    of the wafer.  
11

12            36. The method of claim 34 wherein the displacing comprises  
13    moving the wafer relative to the polishing pad.  
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15            37. The method of claim 34 wherein the displacing comprises  
16    moving the polishing pad relative to the wafer.  
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18            38. The method of claim 34 wherein the displacing comprises  
19    moving both the polishing pad and the wafer.  
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